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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|---------------------------|---------------------|------------------|
| 09/841,654 | 04/24/2001 | David Morris Hamilton JR. | TH2038 (US) | 6431 |
| 7590 | 04/19/2004 | | EXAMINER | |
| Yukiko Iwata Shell Oil Company Legal - Intellectual Property P.O. Box 2463 Houston, TX 77252-2463 | | | PRICE, ELVIS O | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1621 | |
| DATE MAILED: 04/19/2004 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/841,654

Applicant(s)

HAMILTON, DAVID MORRIS

Examiner

Elvis O. Price

Art Unit

1621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. A Request for Continued Examination was filed 12/24/03.
2. Claims 1-49 remain pending in the application.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-49 rejected under 35 U.S.C. 103(a) as being unpatentable over Kharitonov et al. {U.S. Pat. 5,110,995}.

Applicants claim a process comprising: continuously contacting, in a distillation column reactor comprising a reaction zone and a distillation zone, benzene with a zeolite catalyst effective to hydroxylate benzene and an oxidant at a temperature in the range of from above 100⁰ C to 270⁰ C thereby producing a hydroxylated product, at least a portion of said benzene being in a liquid phase; continuously separating said hydroxylated product from the unreacted benzene in the distillation zone under conditions effective to vaporize said unreacted benzene and maintain said hydroxylated product in a liquid phase; and recovering the said hydroxylated product from the distillation column reactor.

Kharitonov et al. teach a process for producing a hydroxylated aromatic compound (phenol) from the oxidation of an aromatic compound (e.g., benzene) with an oxidation catalyst (a zeolite catalyst) and oxidant (nitrous oxide) (see Example 1). The

oxidation catalyst used in the Kharitonov et al. invention is made of high-silica zeolites of various structural types such as ZSM-5, ZSM-11 and BETA (Col. 3, lines 46-68 and Col. 4, lines 1-9), which contain iron and can contain at least one element of periods 2, 3, 4 or 5 of the periodic table (Col. 3, lines 46-54). The selectivity of the hydroxylated aromatic product (phenol) is as much as 100% (see table 1 and 2), and the separation of the hydroxylated product from the un-hydroxylated product is carried out using conventional distillation techniques (Col. 5, lines 10-12). The difference between the presently claimed invention and the Kharitonov et al. reference is that the Kharitonov et al. reference teaches a temperature range from about 275⁰ C to 450⁰ C and is silent about the reaction pressure of their process.

However, it would have been *prima facie* obvious to one having ordinary skill in the art, in view of the Kharitonov et al. invention, to hydroxylate benzene as presently claimed because the presently claimed temperature of about 270⁰ C is sufficiently close to the temperature of about 275⁰ C taught by Kharitonov et al., such a difference in degree would not be rendered patentably distinct from the prior art. It would not be unreasonable for one having ordinary skill in the art to surmise that the temperature of about 275⁰ C (taught by Kharitonov et al.) encompasses, at the very least, temperatures ranging from 270⁰ C to 280⁰ C. Additionally, since Kharitonov et al. are silent with regard to pressure the skilled artisan would have expected that standard atmospheric pressure is being employed in the process of Kharitonov et al.

One having ordinary skill in the art, desiring to decrease energy cost associated with hydroxylating benzene, would have been motivated, in view of the Kharitonov et al.

process, to hydroxylated benzene at the lower temperatures (about 275⁰ C; e.g., from about 270⁰ C to 280⁰ C) taught by kharitonov et al. Thus, the presently claimed process would have been obvious to one having ordinary skill in the art.

Response to Arguments

Applicant's arguments, filed 12/24/03, have been fully considered but they are not persuasive.

Applicant argues that the presently claimed process is carried out in such a way that at least a portion of the benzene is in a liquid phase. Applicant argues that this maintained portion of benzene in the liquid phase is accomplished by using lower temperatures (from above 100 C to 270 C), instead of the higher temperatures (about 275 C to 450 C) taught by Kharitonov et al., and as a result manages the heat generated by the exothermic hydroxylation reaction.

This argument is not convincing because Kharitonov et al. have not taught nor suggested that their process is being carried out in the gas phase. Additionally, it would not be unreasonable for one having ordinary skill in the art to view the temperature of about 275⁰ C, taught by Kharitonov et al., as a temperature which encompasses, at the very least, a temperature range of 270⁰ C to 280⁰ C. Hence, when carrying out the process taught by Kharitonov et al. at the lower temperatures, it would be reasonable to expect that the presently claimed limitation, wherein at least a portion of the benzene is in a liquid phase, would be realized.

Applicant argues that the Kharitonov et al. patent teaches away from the using the claimed lower temperatures because as the temperature of the Kharitonov et al.

process is increased the yield of the desired hydroxylated product is also increased. Thus, Kharitonov et al. teaches away for decreasing the temperature to the presently claimed temperature range from above 100⁰ C to 270⁰ C, and maintaining at least a portion of benzene in a liquid phase.

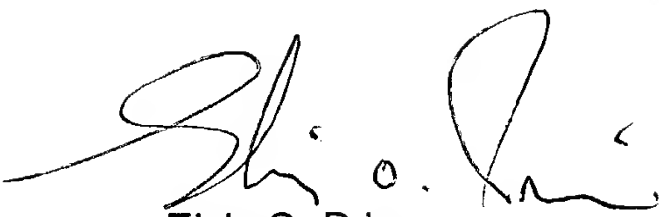
This argument is not convincing because even though an increase yield of the hydroxylated product can be obtained as a result of increased temperature, the Kharitonov et al. invention also demonstrates that benzene can be hydroxylated using the lower temperature recited in the Kharitonov et al. patent (i.e., about 275⁰ C). In fact, the selectivity of the hydroxylated product is higher at the lower temperatures than at the higher temperatures (see Table 1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elvis O. Price whose telephone number is 571 272-0644. The examiner can normally be reached on 8:30 am to 5:00 pm; Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann R. Richter can be reached on 571 272-0646. The fax phone numbers for the organization where this application or proceeding is assigned is 703 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-1235.

Application/Control Number: 09/841,654
Art Unit: 1621



Elvis O. Price

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